EXHIBIT 9
Part 1

FILED UNDER SEAL

SONOS

Sonos and Google

with Google Home Max analysis

January 31, 2018

Confidential

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

TRIAL EXHIBIT 6640

CASE NO. 3:20-cv-06754-WHA

DATE ENTERED_____

BY _____

DEPUTY CLERK

Agenda

- Sonos and its Patent Portfolio
- Sonos and Google (2016-present)
- Sonos innovation relevant to Google Home, including Max
- Representative features relevant to all Google Home/Cast
- Representative features currently relevant to Max
- Next steps

Confidential SONOS-SVG2-00043206

SONOS

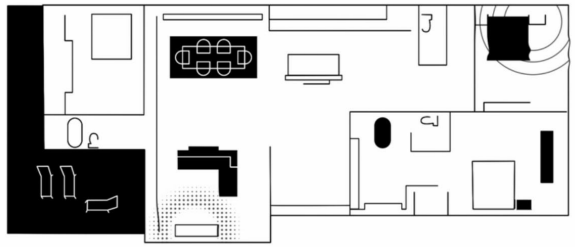
What is Sonos?

Confidential SONOS-SVG2-00043207

SONOS

The Home Sound System

Different Songs in Different Rooms



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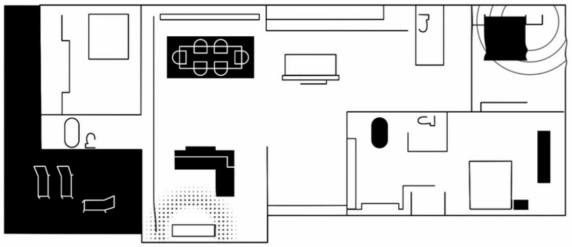
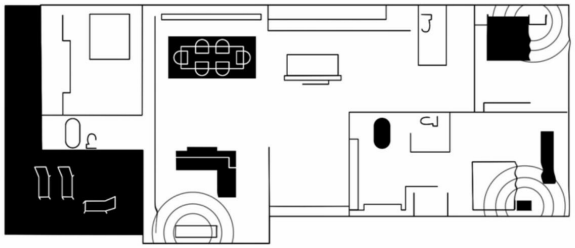
SONOS

The Home Sound System

Different Songs in Different Rooms



Group Rooms to Play the Same Song

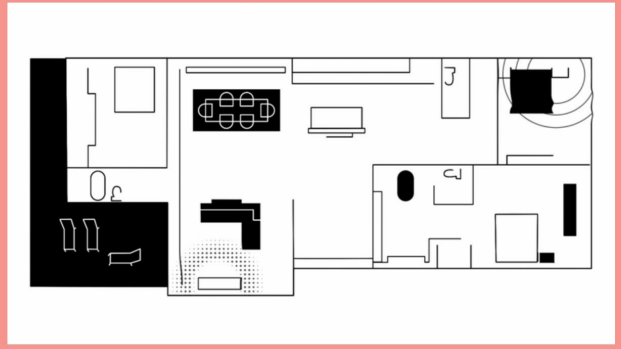


12/14/2017 Confidential and Subject to FRE 408 5

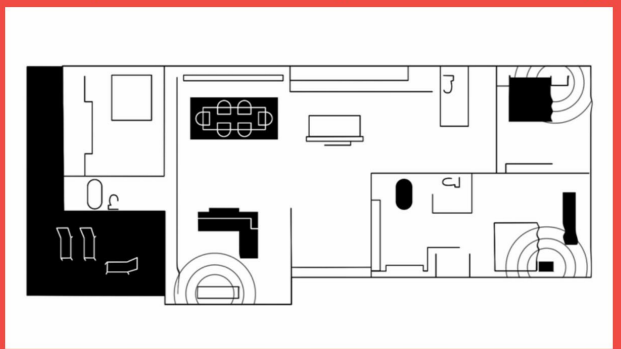
SONOS

The Home Sound System

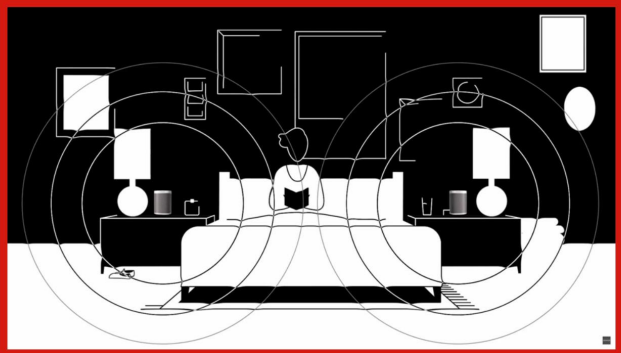
Different Songs in Different Rooms



Group Rooms to Play the Same Song



Stereo Pair



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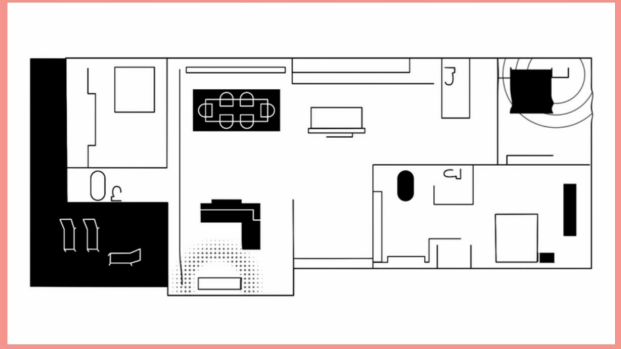
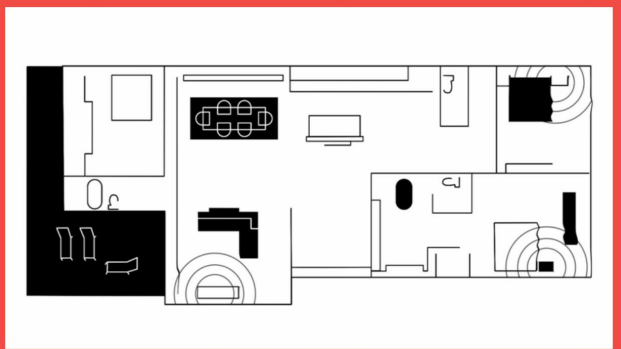
SONOS

The Home Sound System

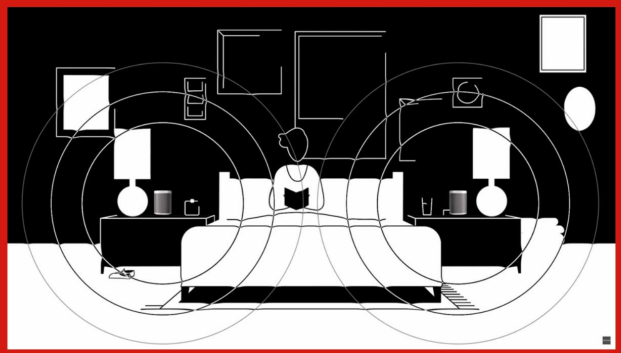
Different Songs in Different Rooms



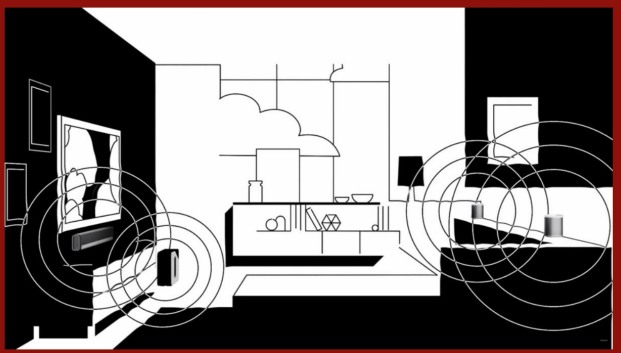
Group Rooms to Play the Same Song



Stereo Pair



Wireless 5.1 Surround Sound



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Sonos' Homegrown Portfolio

Sonos Patent Portfolio:

- 450+ U.S. Patents Issued or Allowed
- 1100+ WW Assets, 700+ US Assets
- ~3 new U.S. Patents/Week
- >50% Practiced

IEEE Patent Power 2017

- 2nd in "Electronics"
- Top 20 in "All" Technologies

IEEE

IEEE Patent Power 2017 - Electronics

Company by Pipeline Power

Company/Organization	Country of Headquarters	Pipeline Power
Apple Inc.	United States	14,285
Sonos Inc.	United States	2,235
LG Electronics Inc.	South Korea	1,960
GoPro Inc.	United States	1,692
iRobot Corp.	United States	1,221
Dolby Laboratories Inc.	United States	1,129
Sony Corp.	Japan	1,101
Canon Inc.	Japan	1,030

https://spectrum.ieee.org/static/interactive-patent-power-2017

Chromecast Audio

Chromecast built-in

Google Home Mini

Google Home

Google Home Max

Google Home

At least 50 Sonos patents across 15 patent families are known to be relevant to the Google Home ecosystem _today_.

Sonos patent subject matter relevant to Google Home:

Audio Content	Platform	Player	Control	Outside Household
Audio from controller	Group management	Antennae switching	Discover/Find content	Cloud queue
Audio from LAN device	Master selection	Audio calibration	Group management	Cross-service integration
Audio via WAN	Networking	Audio processing	Playback control	Retail and marketing
Line-in audio switch	Queue management	Industrial Design	Queue management	Social queues
	Setup	Fault tolerance	Setup	
	Stereo pair	Microphone switching	Social (Party mode)	
	Synchronized playback	Networking	User interface design	
	Voice assistant	Orientation-based audio	Volume control	
		Orientation check		
		Playback control		
		Power management		
		Queue management		

Selected Sonos patent subject matter:

Audio Content	Platform	Player	Control	Outside Household
Audio from controller	Group management	Antennae switching	Discover/Find content	Cloud queue
Audio from LAN device	Master selection	**Audio calibration**	Group management	Cross-service integration
Audio via WAN	Networking	Audio processing	Playback control	Retail and marketing
Line-in audio switch	Queue management	**Industrial Design**	Queue management	Social queues
	Setup	Fault tolerance	Setup	
	Stereo pair	Microphone switching	Social (Party mode)	
	Synchronized playback	Networking	User interface design	
	Voice assistant	**Orientation-based audio**	Volume control	
		Orientation check		
		Playback control		
		Power management		
		Queue management		

* Subject matter in bold became relevant with release of Google Home Max

Selected Sonos patents for discussion:

Audio Content	Platform	Player	Control	Outside Household
Audio via WAN	Group management	**Audio calibration**	Group management	
US9,727,302	US9,348,824	US9,219,460	US8,843,228	
	Stereo pair	**Industrial Design**	Volume control	
	US9,202,509	D768,602	US8,588,949	
	US9,219,959	D796,447		
	15/228,685 (Allowed)	**Orientation-based audio**		
	Voice assistant	US9,042,556		
	US9,826,306	US9,748,647		
	US9,820,039	**Orientation check**		
		US9,367,611		
		Playback control		
		US9,671,780		
		Power management		
		US9,252,721		

US Patent No.: 9,727,302

SONOS

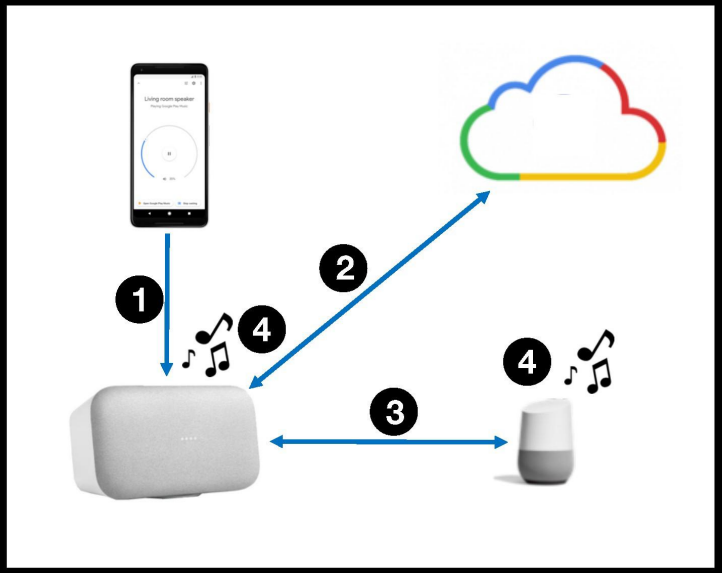
Title: Obtaining content from remote source for playback

Priority Date: 7/28/2003

Issue Date: 8/8/2017

This patent involves a first independently clocked playback device:

1. Receiving from a controller, audio source information via a WAN.
2. Obtaining audio based on the audio source information.
3. Transmitting to a second independently clocked device, (i) the audio, (ii) playback timing information corresponding to the audio, and (iii) device clock information of the playback device.
4. Playing back the audio in synchrony with the second playback device.



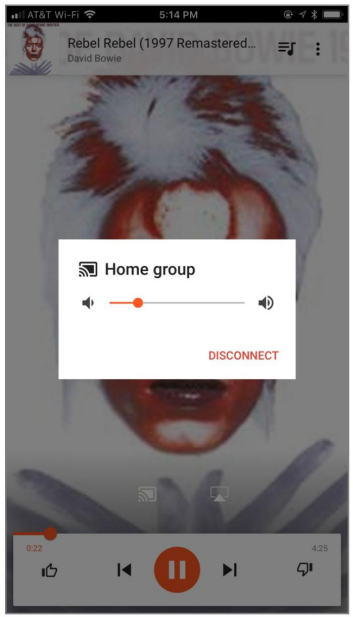
Obtaining content from remote source for playback

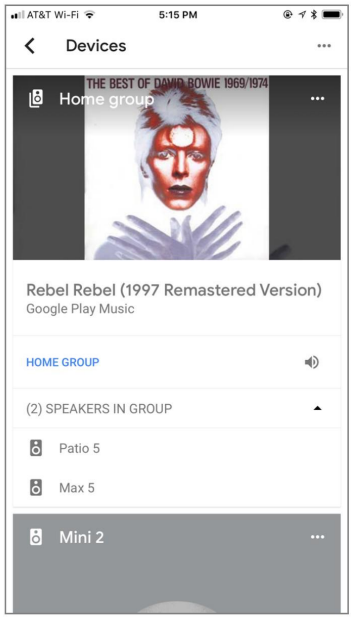
U.S. Patent No. 9,727,302; 7/28/2003

1. A method comprising:

receiving, by a first playback device from a network device configured to control the first playback device and communicatively coupled to the first playback device over a network, control information identifying an audio information source… accessible … via a wide area network (WAN); and

after receiving the control information (i) obtaining, by the first playback device from the audio information source, audio information; (ii) transmitting, by the first playback device to a second playback device, the audio information, playback timing information associated with the audio information, and device clock information of the first playback device; and (iii) playing back, by the first playback device, the audio information in synchrony with the second playback device by using the playback timing information associated with the audio information and the device clock information of the first playback device to play back the audio information, ….





A Home device receives from a Chromecast-enabled application (i.e. Google Play Music), information identifying an audio source.

The Home device obtains audio from the identified audio source.

* see claim 1 of U.S. Patent 9,727,302 for complete claim language

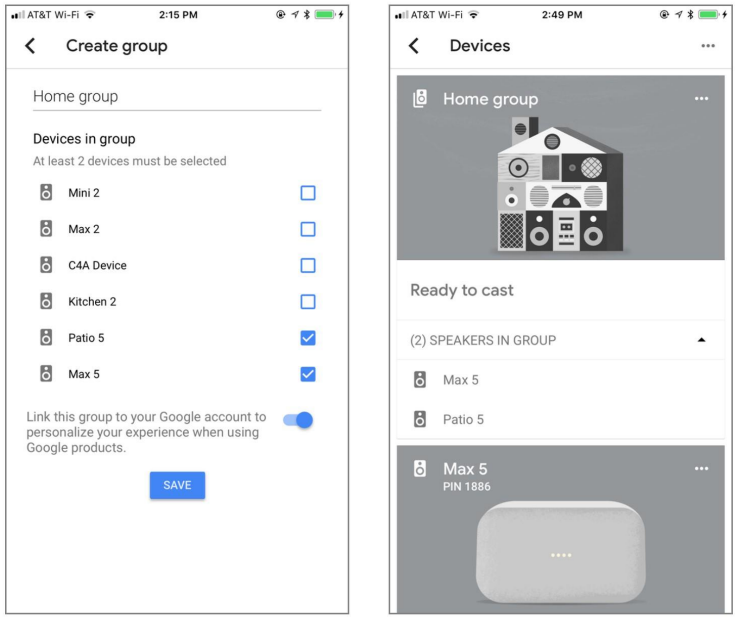
Obtaining content from remote source for playback

U.S. Patent No. 9,727,302; 7/28/2003

1. A method comprising:

receiving, by a first playback device from a network device configured to control the first playback device and communicatively coupled to the first playback device over a network, control information identifying an audio information source… accessible … via a wide area network (WAN); and

after receiving the control information (i) obtaining, by the first playback device from the audio information source, audio information; (ii) transmitting, by the first playback device to a second playback device, the audio information, playback timing information associated with the audio information, and device clock information of the first playback device; and (iii) playing back, by the first playback device, the audio information in synchrony with the second playback device by using the playback timing information associated with the audio information and the device clock information of the first playback device to play back the audio information, ….



Master Home device in a group transmits clock timing information, audio information, and corresponding playback timing information.

* see claim 1 of U.S. Patent 9,727,302 for complete claim language

Obtaining content from remote source for playback

U.S. Patent No. 9,727,302; 7/28/2003

1. A method comprising:

receiving, by a first playback device from a network device configured to control the first playback device and communicatively coupled to the first playback device over a network, control information identifying an audio information source… accessible … via a wide area network (WAN); and

after receiving the control information (i) obtaining, by the first playback device from the audio information source, audio information; (ii) transmitting, by the first playback device to a second playback device, the audio information, playback timing information associated with the audio information, and device clock information of the first playback device; and (iii) playing back, by the first playback device, the audio information in synchrony with the second playback device by using the playback timing information associated with the audio information and the device clock information of the first playback device to play back the audio information, ….

* see claim 1 of U.S. Patent 9,727,302 for complete claim language

Home devices in the group play audio in synchrony based on the exchanged audio information, playback timing information, and device clock information.

"So we made sure to design Google Home so they can work better together. For example, we've enabled multi-room audio support across Google Home devices. This allows you to create a group and play the same song across the devices at the same exact time." - Rishi Chandra, October 4, 2016

*https://www.youtube.com/watch?v=zLHbdRsBCLg; 16:45-17:20

US Patent No.: 8,588,949; 90/013,423

Litigated | Re-Examined

SONOS

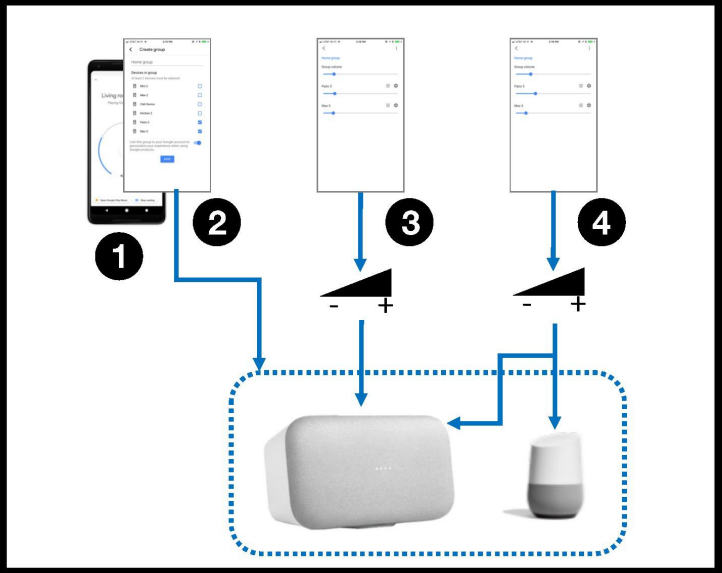
Title: Method and apparatus for adjusting volume in a multi-zone system

Priority Date: 06/05/2004

Issue Date: 11/19/2013; 11/5/2015

This patent involves a controller device:

1. Providing an interface for a player group.
2. Accepting input to facilitate forming a player group.
3. Accepting input to adjust a volume of an individual player in the player group.
4. Accepting input to adjust a volume of the player group.



Litigation: Sonos Inc. v. D&M Holdings Inc.[1:14-cv-01330]

Method and apparatus for adjusting volume levels in multi-zone system

U.S. Patent No. 8,588,949 (90/013,423); 6/05/2004 **Litigated** **Re-Examined**

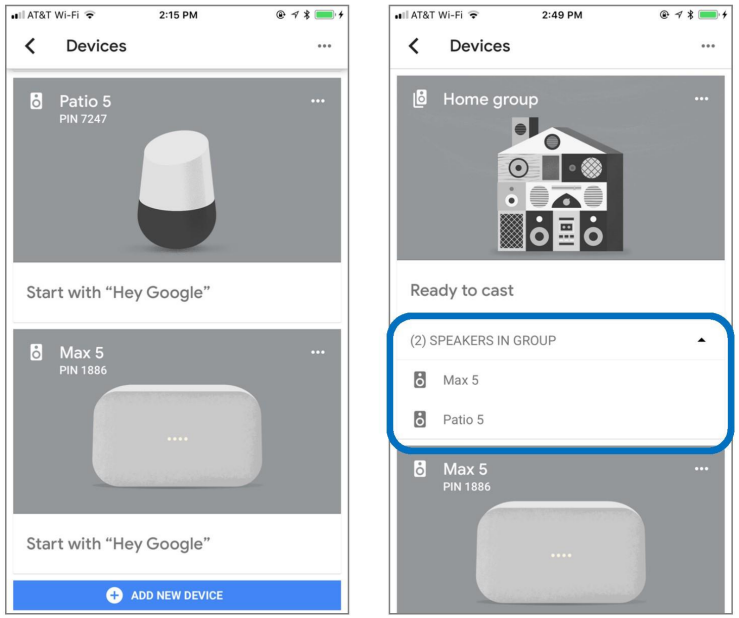
1. A multimedia controller … configured to:

provide a user interface for a player group, wherein the player group includes a plurality of players in a local area network…;

accept via the user interface an input to facilitate formation of the player group, wherein the input to facilitate formation of the player group indicates that at least two of the plurality of players in the local area network are to be included in the player group …;

for any individual player in the player group, accept via the user interface a player-specific input to adjust a volume of that individual player, wherein the player-specific input to adjust the volume of that individual player causes that individual player to adjust its volume; and

accept via the user interface a group-level input to adjust a volume associated with the player group, wherein the group-level input to adjust the volume associated with the player group causes each of the players in the player group to adjust its respective volume.



* see claim 1 of U.S. Patent 8,588,949 for complete claim language

Method and apparatus for adjusting volume levels in multi-zone system

U.S. Patent No. 8,588,949 (90/013,423); 6/05/2004 **Litigated** **Re-Examined**

1. A multimedia controller … configured to:

provide a user interface for a player group, wherein the player group includes a plurality of players in a local area network…;

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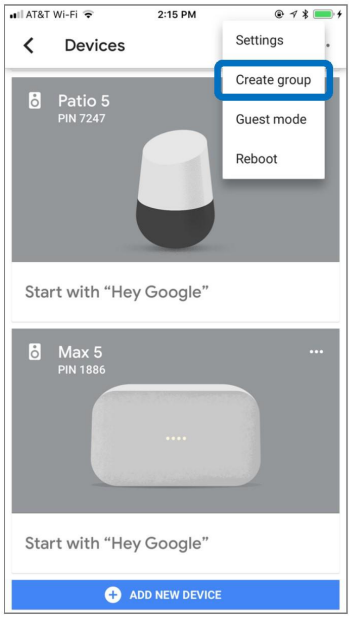

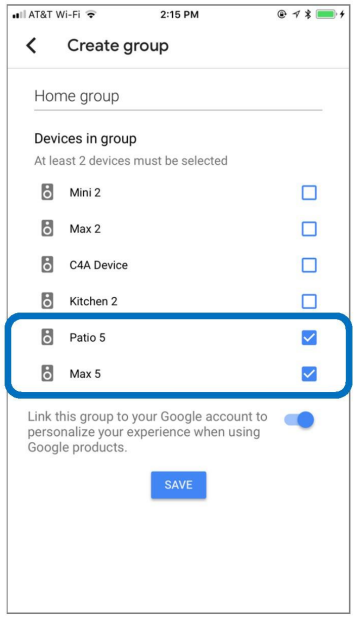

* see claim 1 of U.S. Patent 8,588,949 for complete claim language

Method and apparatus for adjusting volume levels in multi-zone system

U.S. Patent No. 8,588,949 (90/013,423); 6/05/2004

Litigated Re-Examined

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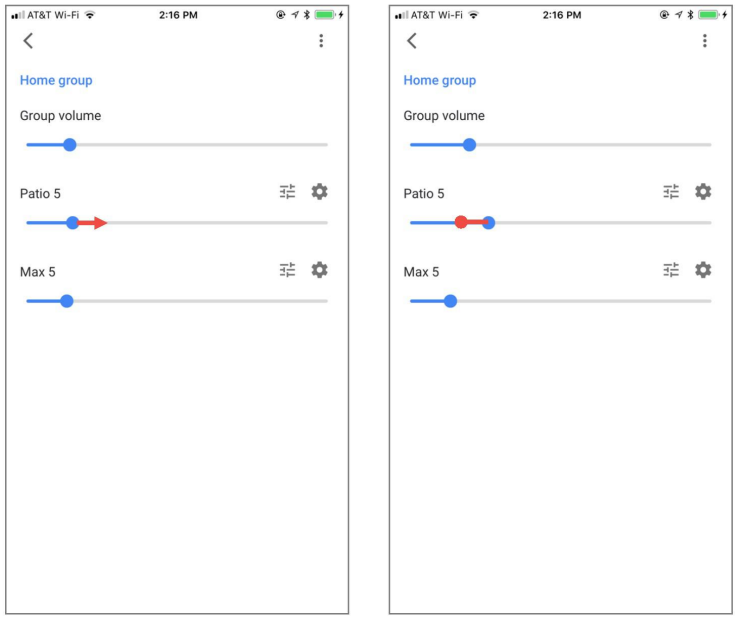
accept via the user interface an input to facilitate formation of the player group, wherein the input to facilitate formation of the player group indicates that at least two of the plurality of players in the local area network are to be included in the player group …;

for any individual player in the player group, accept via the user interface a player-specific input to adjust a volume of that individual player, wherein the player-specific input to adjust the volume of that individual player causes that individual player to adjust its volume; and

accept via the user interface a group-level input to adjust a volume associated with the player group, wherein the group-level input to adjust the volume associated with the player group causes each of the players in the player group to adjust its respective volume.



* see claim 1 of U.S. Patent 8,588,949 for complete claim language

Method and apparatus for adjusting volume levels in multi-zone system

U.S. Patent No. 8,588,949 (90/013,423); 6/05/2004

Litigated Re-Examined

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for any individual player in the player group, accept via the user interface a player-specific input to adjust a volume of that individual player, wherein the player-specific input to adjust the volume of that individual player causes that individual player to adjust its volume; and

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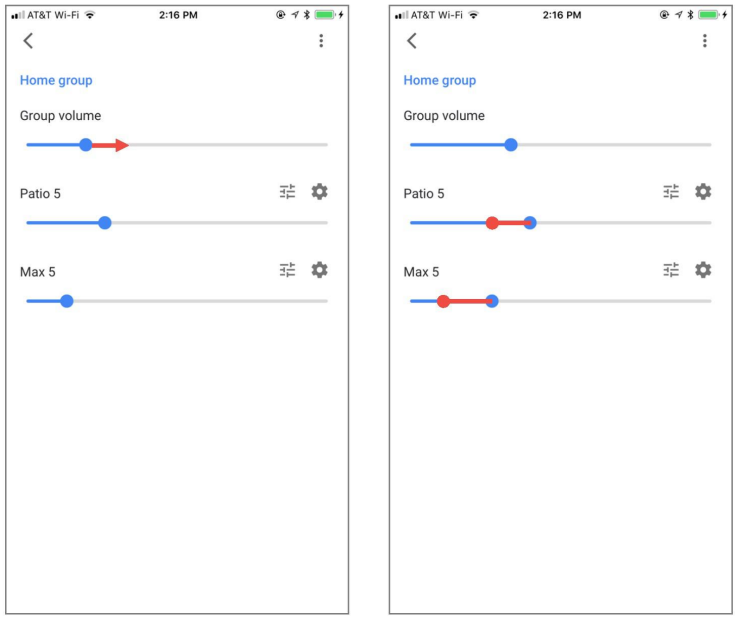


* see claim 1 of U.S. Patent 8,588,949 for complete claim language

US Patent No.: 9,348,824

SONOS

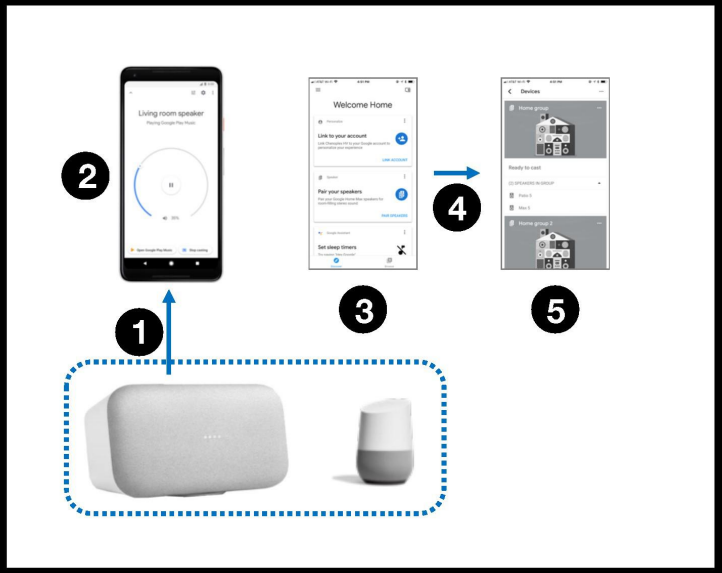
Title: Device group identification

Priority Date: 6/18/2014

Issue Date: 5/24/2016

This patent involves a controller device:

1. Receiving from a playback device, a transmission indicating a group identification of a particular zone group.
2. Storing data indicating that the playback device. is associated with the group identification
3. Receiving an input to display representation of zone groups.
4. Identifying the playback device based on the group identification.
5. Displaying a representation of of the particular zone group.



Device group identification

U.S. Patent No. 9,348,824; 6/18/2014

1. A method comprising:

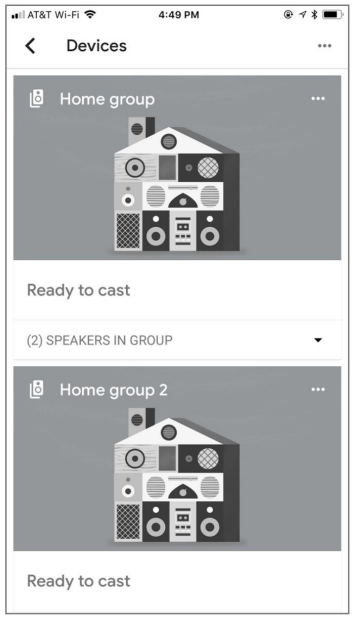
receiving, by a controller device from a playback device of a media playback system, a transmission indicating a group identification corresponding to a particular zone group in the media playback system;

storing, by the controller device, in data storage, data indicating that the playback device is associated with the group identification;

after storing the data in the data storage, receiving, by the controller device, an input to display representations of zone groups in the media playback system;

responsive to receiving the input, identifying, by the controller device in the data storage, the playback device based on the group identification indicated in the received transmission; and

causing, by the controller device, a controller interface to display a representation of the particular zone group according to the group identification, wherein the representation indicates that the playback device is a part of the particular zone group.



When initializing Google Home app, information indicating available groups and devices are received and displayed.

Refresh of available groups and devices can also be initiated within the app, during which updated information is received.

Device group identification

U.S. Patent No. 9,348,824; 6/18/2014

1. A method comprising:

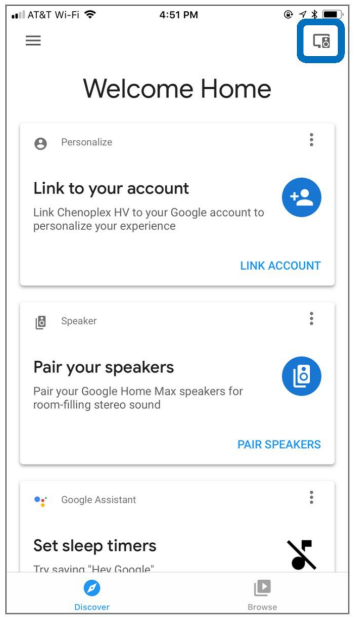
receiving, by a controller device from a playback device of a media playback system, a transmission indicating a group identification corresponding to a particular zone group in the media playback system;

storing, by the controller device, in data storage, data indicating that the playback device is associated with the group identification;

after storing the data in the data storage, receiving, by the controller device, an input to display representations of zone groups in the media playback system;

responsive to receiving the input, identifying, by the controller device in the data storage, the playback device based on the group identification indicated in the received transmission; and

causing, by the controller device, a controller interface to display a representation of the particular zone group according to the group identification, wherein the representation indicates that the playback device is a part of the particular zone group.



After the information is received and stored, an icon is selectable to display available groups and devices.

Device group identification

U.S. Patent No. 9,348,824; 6/18/2014

1. A method comprising:

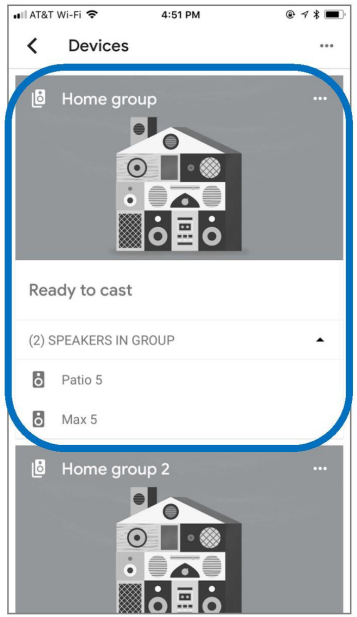
receiving, by a controller device from a playback device of a media playback system, a transmission indicating a group identification corresponding to a particular zone group in the media playback system;

storing, by the controller device, in data storage, data indicating that the playback device is associated with the group identification;

after storing the data in the data storage, receiving, by the controller device, an input to display representations of zone groups in the media playback system;

responsive to receiving the input, identifying, by the controller device in the data storage, the playback device based on the group identification indicated in the received transmission; and

causing, by the controller device, a controller interface to display a representation of the particular zone group according to the group identification, wherein the representation indicates that the playback device is a part of the particular zone group.



Available groups, and devices in the available groups are displayed based on the previously received and stored information.

US Patent No.: 8,843,228

SONOS

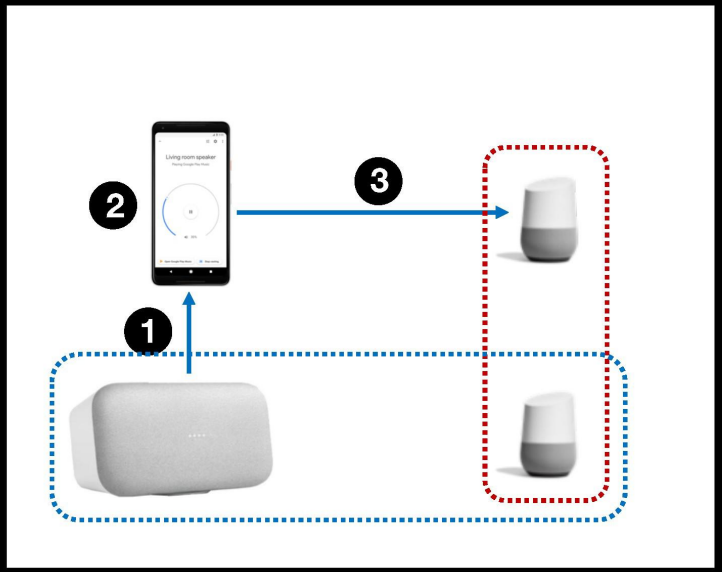
Title: Method and apparatus for updating zone configurations in a multi-zone system

Priority Date: 9/12/2006

Issue Date: 9/23/2014

This patent involves a controller device:

1. Receiving zone configuration characterizing one or more zone scenes.
2. Receiving an input to invoke one of the one or more zone scenes.
3. Based on the input, instructing two or more playback devices to form a group based on the invoked zone scene.



Method and apparatus for updating zone configurations in a multi-zone system

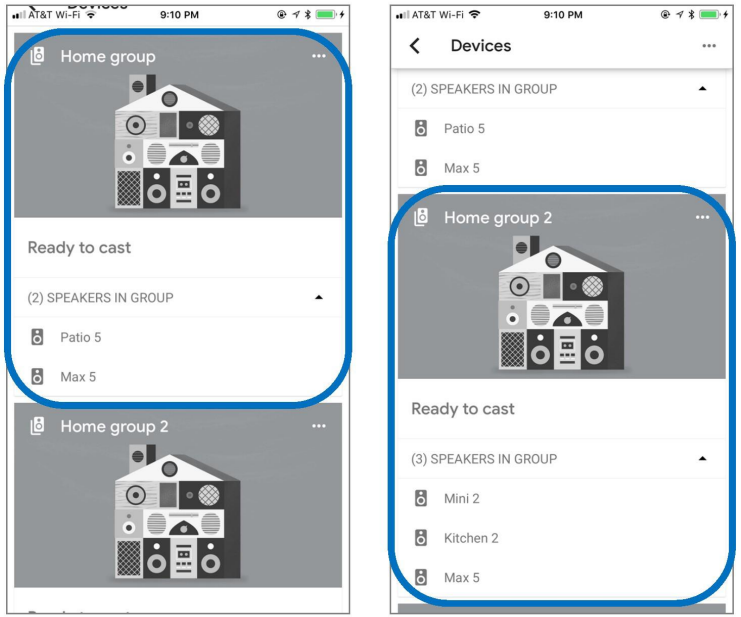
U.S. Patent No. 8,843,228; 9/12/2006

1. In a network comprising a plurality of independent playback devices, a method comprising:

receiving via the network by a controller device, a zone configuration from one of the plurality of independent playback devices, wherein the zone configuration is maintained at one or more of the plurality of independent playback devices, and wherein the zone configuration characterizes one or more zone scenes, each zone scene identifying a group configuration associated with two or more of the plurality of independent playback devices;

receiving, by the controller device, an input to invoke a zone scene of the one or more zone scenes; and

based on the input, instructing, by the controller device, two or more of the plurality of independent playback devices to be grouped in accordance with the invoked zone scene.



Zone scenes are populated on screen based on zone configuration information received from the playback device(s).

* see claim 1 of U.S. Patent 8,843,228 for complete claim language

Method and apparatus for updating zone configurations in a multi-zone system

U.S. Patent No. 8,843,228; 9/12/2006

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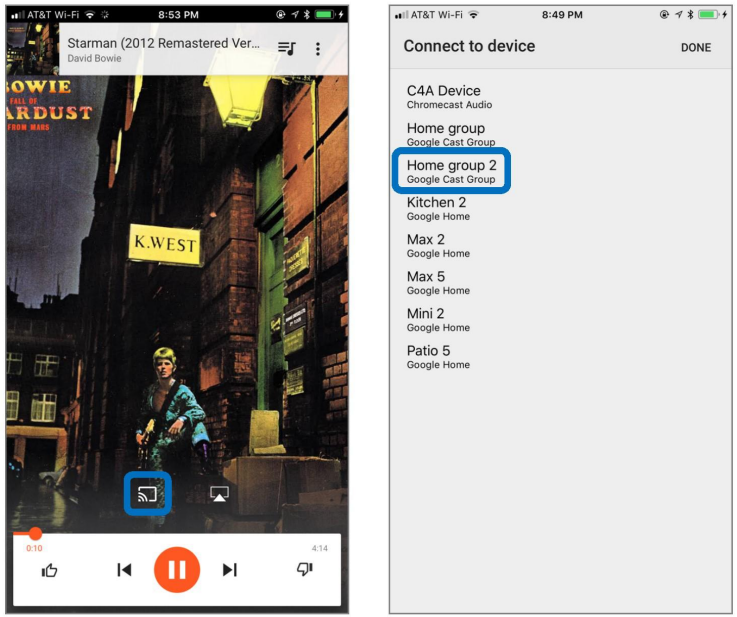
receiving via the network by a controller device, a zone configuration from one of the plurality of independent playback devices, wherein the zone configuration is maintained at one or more of the plurality of independent playback devices, and wherein the zone configuration characterizes one or more zone scenes, each zone scene identifying a group configuration associated with two or more of the plurality of independent playback devices;

receiving, by the controller device, an input to invoke a zone scene of the one or more zone scenes; and

based on the input, instructing, by the controller device, two or more of the plurality of independent playback devices to be grouped in accordance with the invoked zone scene.



An input on the controller can invoke a zone scene of the one or more zone scenes.

* see claim 1 of U.S. Patent 8,843,228 for complete claim language

Method and apparatus for updating zone configurations in a multi-zone system

U.S. Patent No. 8,843,228; 9/12/2006

1. In a network comprising a plurality of independent playback devices, a method comprising:

receiving via the network by a controller device, a zone configuration from one of the plurality of independent playback devices, wherein the zone configuration is maintained at one or more of the plurality of independent playback devices, and wherein the zone configuration characterizes one or more zone scenes, each zone scene identifying a group configuration associated with two or more of the plurality of independent playback devices;

receiving, by the controller device, an input to invoke a zone scene of the one or more zone scenes; and

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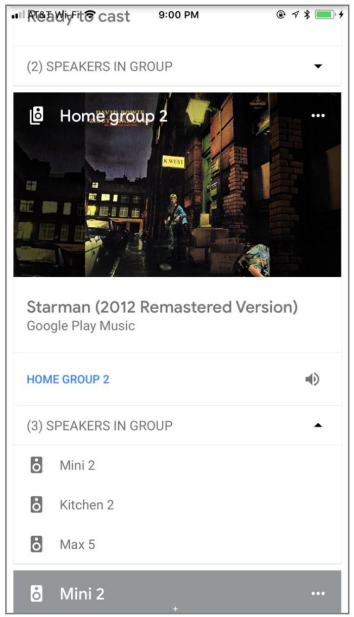


The playback devices in the invoked zone scene begin playing back audio as a group.

* see claim 1 of U.S. Patent 8,843,228 for complete claim language

US Patent No.: 9,826,306

SONOS

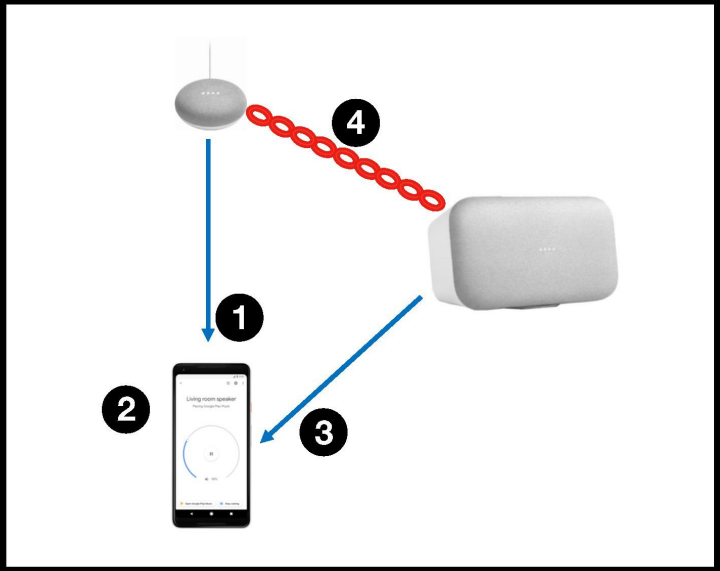
Title: Default playback device designation

Priority Date: 2/22/2016

Issue Date: 11/21/2017

This patent involves a computing device:

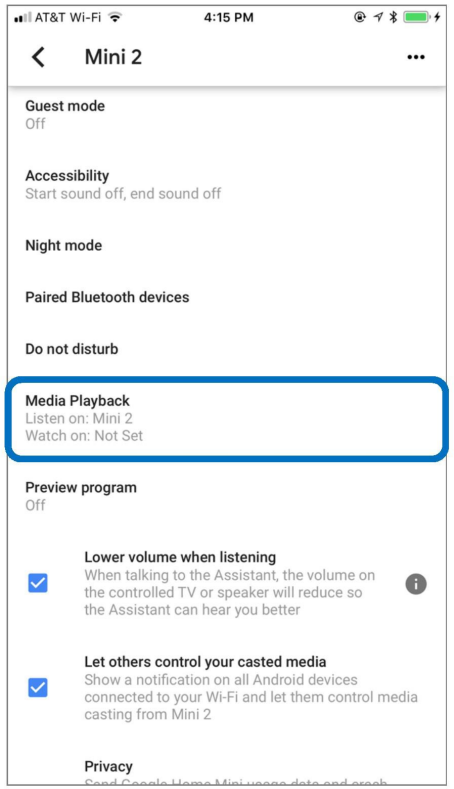
1. Determining that a network microphone device is available for assignment.
2. Display prompt to select from a plurality of playback zone.
3. Receiving an input indicating a selection a playback zone to assign as the default output device for the network microphone device.
4. Causing the assignment to be stored.



Default playback device designation

U.S. Patent No. 9,826,306; 2/22/2016

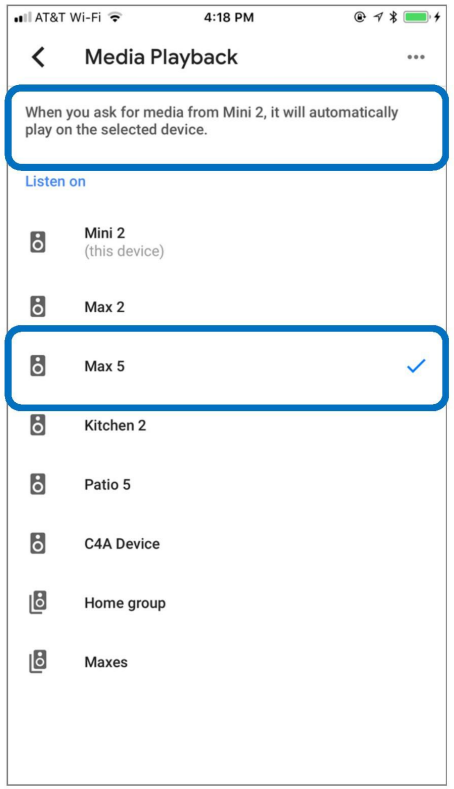
1. A computing device comprising:
a processor; and
memory having stored thereon instructions executable by the computing device to perform functions comprising:
determining that a network microphone device is available for assignment to one of a plurality of playback zones within a local playback network;
displaying a prompt to select among the plurality of playback zones, a given playback zone to which the network microphone device is to be assigned, wherein assigning the given playback zone to the network microphone device comprises configuring the playback device of the given playback zone to be a default output device in response to voice inputs received via the network microphone device;
receiving an input indicating a selection of a particular playback zone of the plurality of playback zones; and
causing to be stored data indicating an assignment of the network microphone device to the particular playback zone.



Default playback device designation

U.S. Patent No. 9,826,306; 2/22/2016

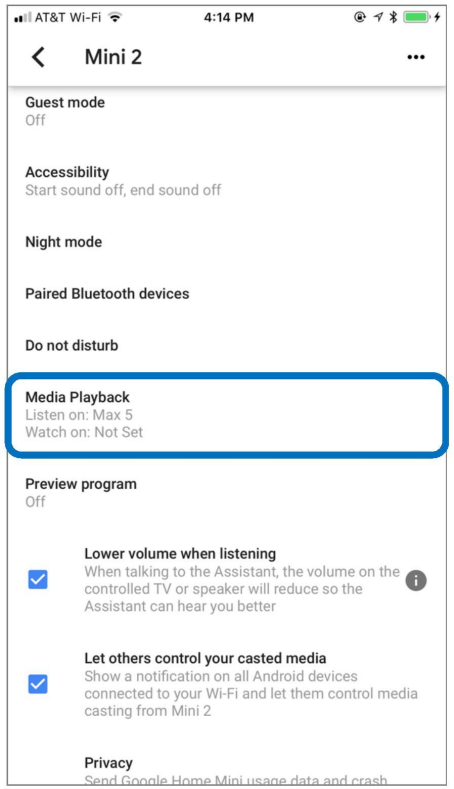
1. A computing device comprising:
a processor; and
memory having stored thereon instructions executable by the computing device to perform functions comprising:
determining that a network microphone device is available for assignment to one of a plurality of playback zones within a local playback network;
displaying a prompt to select among the plurality of playback zones, a given playback zone to which the network microphone device is to be assigned, wherein assigning the given playback zone to the network microphone device comprises configuring the playback device of the given playback zone to be a default output device in response to voice inputs received via the network microphone device;
receiving an input indicating a selection of a particular playback zone of the plurality of playback zones; and
causing to be stored data indicating an assignment of the network microphone device to the particular playback zone.



Default playback device designation

U.S. Patent No. 9,826,306; 2/22/2016

1. A computing device comprising:
a processor; and
memory having stored thereon instructions executable by the computing device to perform functions comprising:
determining that a network microphone device is available for assignment to one of a plurality of playback zones within a local playback network;
displaying a prompt to select among the plurality of playback zones, a given playback zone to which the network microphone device is to be assigned, wherein assigning the given playback zone to the network microphone device comprises configuring the playback device of the given playback zone to be a default output device in response to voice inputs received via the network microphone device;
receiving an input indicating a selection of a particular playback zone of the plurality of playback zones; and
causing to be stored data indicating an assignment of the network microphone device to the particular playback zone.



US Patent No.: 9,820,039

SONOS

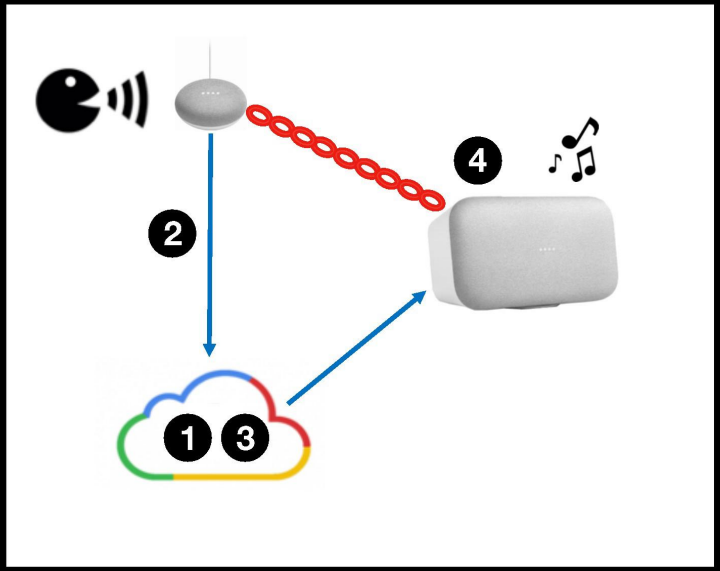
Title: Default playback devices

Priority Date: 2/22/2016

Issue Date: 11/14/2017

This patent involves a computing device:

1. Maintaining database of network microphone device and playback device assignments.
2. Receiving from a network microphone device a voice input with a media playback command.
3. Determining that voice input did not indicate output playback device, and identifying a particular playback device assigned to the network microphone device.
4. Transmitting a message to the particular playback device to execute the media playback command.



Default playback devices

U.S. Patent No. 9,820,039; 2/22/2016

1. A computing device … to perform functions comprising:

maintaining …data indicating an assignment of an identification of a network microphone device to a particular playback zone of a media playback system, wherein the particular playback zone comprises at least one playback device;

receiving from the network microphone device, data indicating a voice input comprising a media playback command;

determining that the voice input does not comprise an indication of any playback zone in the media playback system;

in response to determining that the voice input does not comprise an indication of any playback zone in the media playback system, identifying … the particular playback zone in the media playback system based on the data indicating the assignment of the identification of the network microphone device to the particular playback zone; and

…, transmitting to the at least one playback device of the particular playback zone, a message indicating the media playback command to cause the at least one playback device of the particular playback zone to execute the media playback command.

Continuing with the scenario, in which Max 5 is configured as the default output device for Mini 2:

Voice command to Mini 2: "Play all along the watchtower ***on patio 5***"

Resulting Action: "All Along The Watchtower" begins playing on Patio 5 speaker.

Voice command to Mini 2:"play all along the watchtower."

Resulting Action: "All Along The Watchtower" begins playing on Max 5.

* see Claim 1 of U.S. Patent 9,820,039 for complete claim language

US Patent No.: 9,252,721

SONOS

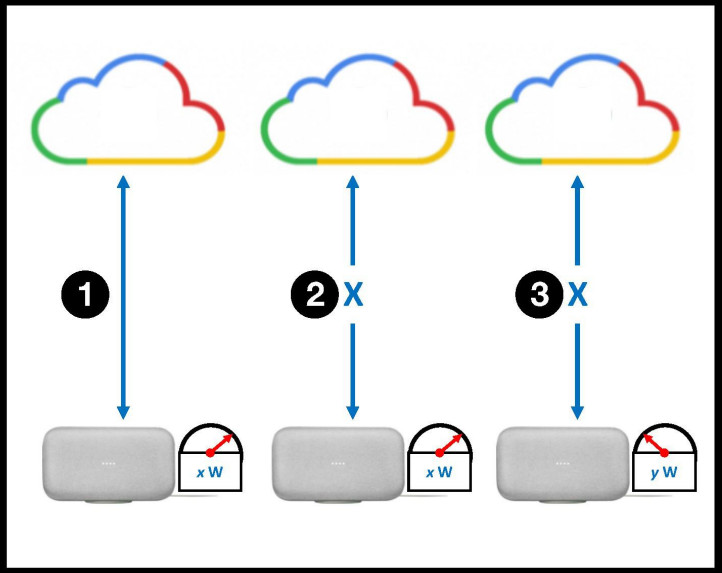
Title: Power decrease based on packet type

Priority Date: 5/15/2004

Issue Date: 2/2/2016

This patent involves a playback device:

1. While operating in a first power mode, receive particular packets.
2. Determining that a defined time has passed since the particular packets were received.
3. Transitioning to operate in a second power mode. The first power mode consumes more power than the second power mode.



Power decrease based on packet type

U.S. Patent No. 9,252,721; 5/15/2004

1. A playback device … to:

operate in a first power mode in which the amplifier consumes a first amount of power;

while operating in the first power mode, receive one or more packets addressed to the playback device, and determine that a defined time has passed since receiving a specified type of data packet; and

after determining that the defined time has passed since receiving the specified type of data packet, transition from operating in the first power mode to operate in a second power mode in which the amplifier consumes a second amount of power, wherein the first amount of power is greater than the second amount of power.

The amplifier in Google Home Max consumes a first wattage when a Cast session is established, and is playing or ready to play audio.

* see Claim 1 of U.S. Patent 9,252,721 for complete claim language

Power decrease based on packet type

U.S. Patent No. 9,252,721; 5/15/2004

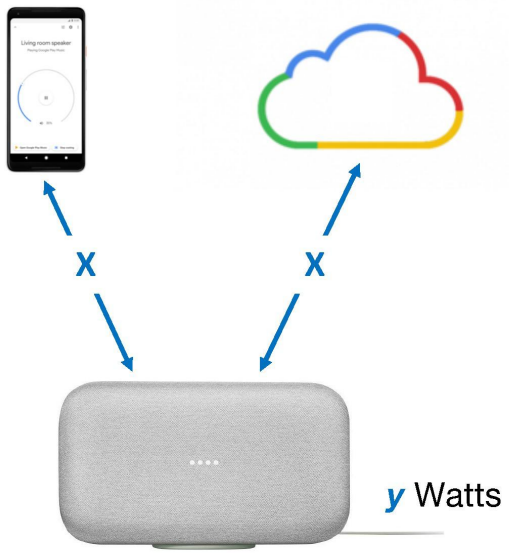
1. A playback device … to:

operate in a first power mode in which the amplifier consumes a first amount of power;

while operating in the first power mode, receive one or more packets addressed to the playback device, and determine that a defined time has passed since receiving a specified type of data packet; and

after determining that the defined time has passed since receiving the specified type of data packet, transition from operating in the first power mode to operate in a second power mode in which the amplifier consumes a second amount of power, wherein the first amount of power is greater than the second amount of power.

The amplifier in Google Home Max begins consuming a second wattage when a duration of time has passed after the Cast session is terminated.



* see Claim 1 of U.S. Patent 9,252,721 for complete claim language

Power decrease based on packet type

U.S. Patent No. 9,252,721; 5/15/2004

1. A playback device … to:

operate in a first power mode in which the amplifier consumes a first amount of power;

while operating in the first power mode, receive one or more packets addressed to the playback device, and determine that a defined time has passed since receiving a specified type of data packet; and

after determining that the defined time has passed since receiving the specified type of data packet, transition from operating in the first power mode to operate in a second power mode in which the amplifier consumes a second amount of power, wherein the first amount of power is greater than the second amount of power.

x Watts **>** ***y*** Watts

* see Claim 1 of U.S. Patent 9,252,721 for complete claim language